

PART 3.

Design of Public Water Systems

WAC 246-290-200 Design standards. (1) Purveyors shall ensure that good engineering criteria and practices are used in the design and construction of all public water systems, such as those set out in:

- (a) Department guidance on design for Group A public water systems;
 - (b) The most recent published edition of the Uniform Building Code (UBC) or the Uniform Plumbing Code (UPC);
 - (c) The most recent published edition of *Recommended Standards for Water Works, A Committee Report of the Great Lakes - Upper Mississippi River Board of State Public Health and Environmental Managers*;
 - (d) Standard specifications of the American Public Works Association (APWA), the American Society of Civil Engineers (ASCE), the American Water Works Association (AWWA), or the American Society for Testing and Materials (ASTM);
 - (e) Design criteria, such as contained in current college texts and professional journal articles, acceptable to the department;
 - (f) Chapter 173-160 WAC *Minimum Standards for Construction and Maintenance of Water Wells*;
 - (g) The latest edition of the PNWS-AWWA Cross-Connection Control Manual, or the University of Southern California (USC) Manual of Cross-Connection Control.
- (2) In addition, purveyors of new or expanding public water systems shall consider and use, as appropriate, the following design factors:
- (a) Historical water use;
 - (b) Community versus recreational uses of water;
 - (c) Local conditions and/or regulations;
 - (d) Community expectations;
 - (e) Public Water System Coordination Act considerations where appropriate;
 - (f) Provisions for systems and component reliability in accordance with WAC 246-290-420;
 - (g) Wind pressures, seismic risk, snow loads, and flooding;
 - (h) Other risks from potential disasters, as feasible; and
 - (i) Other information as required by the department.

[Statutory Authority: RCW 43.02.050. 99-07-021, § 246-290-200, filed 3/9/99, effective 4/9/99. Statutory Authority: RCW 43.20.050. 93-08-011 (Order 352B), § 246-290-200, filed 3/25/93, effective 4/25/93; 91-02-051 (Order 124B), recodified as § 246-290-200, filed 12/27/90, effective 1/31/91. Statutory Authority: RCW 34.04.045. 88-05-057 (Order 307), § 248-54-105, filed 2/17/88. Statutory Authority: RCW 43.20.050. 83-19-002 (Order 266), § 248-54-105, filed 9/8/83.]

WAC 246-290-220 Drinking water materials and additives. (1) All materials shall conform to the ANSI/NSF Standard 61 if in substantial contact with potable water supplies. For the purposes of this section, "substantial contact" means the elevated degree that a material in contact with water may release leachable contaminants into the water such that levels of these contaminants may be unacceptable with respect to either public health or aesthetic concerns. It should take into consideration the total material/water interface area of exposure, volume of water exposed, length of time water is in contact with the material, and level of public health risk. Examples of water system components that would be considered to be in "substantial contact" with drinking water are filter media, storage tank interiors or liners, distribution piping, membranes, exchange or adsorption media, or other similar components that would have high potential for contacting the water. Materials associated with such components as valves, pipe

fittings, debris screens, gaskets, or similar appurtenances would not be considered to be in substantial contact.

(2) Materials or additives in use prior to the effective date of these regulations that have not been listed under ANSI/NSF Standard 60 or 61 shall be allowed for their current applications until such time that the materials are scheduled for replacement, or that stocks of existing additives are depleted and scheduled for reorder.

(3) Any treatment chemicals, with the exception of commercially retailed hypochlorite compounds such as unscented Clorox, Purex, etc., added to water intended for potable use shall comply with ANSI/NSF Standard 60. The maximum application dosage recommendation for the product certified by the ANSI/NSF Standard 60 shall not be exceeded in practice.

(4) Any products used to coat, line, seal, patch water contact surfaces or that have substantial water contact within the collection, treatment, or distribution systems shall comply with the appropriate ANSI/NSF Standard 60 or 61. Application of these products shall comply with recommendations contained in the product certification.

(5) The department may accept continued use of, and proposals involving, certain noncertified chemicals or materials on a case-by-case basis, provided all of the following criteria are met:

(a) The chemical or material has an acknowledged and demonstrable history of use in the state for drinking water applications;

(b) There exists no substantial evidence that the use of the chemical or material has caused consumers to register complaints about aesthetic issues, or health related concerns, that could be associated with leachable residues from the material; and

(c) The chemical or material has undergone testing through a protocol acceptable to the department and has been found to not contribute leachable compounds into drinking water at levels that would be of public health concern.

(6) Any pipe, pipe fittings, solder, or flux used in the installation or repair of a public water system (or for any plumbing, fittings or fixtures in a facility providing water for human consumption) shall be lead-free:

(a) This prohibition shall not apply to leaded joints necessary for the repair of cast iron pipes; and

(b) Within the context of this section, lead-free shall mean:

(i) No more than eight percent lead in pipes and pipe fittings; ~~((and))~~

(ii) No more than two-tenths of one percent lead in solder and flux ~~((+))~~; and

(iii) Fittings and fixtures that are in compliance with standards established in accordance with 42 USC 300g-6(e).

[Statutory Authority: RCW 43.02.050. 99-07-021, § 246-290-220, filed 3/9/99, effective 4/9/99. Statutory Authority: RCW 43.20.050. 91-02-051 (Order 124B), recodified as § 246-290-220, filed 12/27/90, effective 1/31/91. Statutory Authority: RCW 34.04.045. 88-05-057 (Order 307), § 248-54-131, filed 2/17/88.]

WAC 246-290-221 Water demand design criteria. (1) Except as provided in this section, expanding systems shall use water demand design for average day demand (ADD), and peak periods of demand such as maximum day demand (MDD), and peak hourly demand (PHD) that are based upon actual metered water use records. The data collected shall be sufficient to account for seasonal or other cyclic changes in water demand, and shall correlate to the maximum number of full-time or part-time equivalent residential units in service at any time.

(2) For seasonally used, transitory noncommunity, or recreational developments the design for ADD, MDD, and PHD shall be based upon metered water uses whenever such data is available. The data must account for the daily population using the water over the time that records are collected, and must reflect the uses associated with maximum occupancy for the development. The design demands for these developments apply only to part-time uses, and may not be applied to structures or dwellings that can be permanently occupied.

(3) In the absence of metered use or other comparable information, the following sources of design information may be used:

(a) Comparable metered water use data from analogous water systems. Analogous systems are those with similar characteristics, such as demographics, housing sizes, income levels, lot sizes, climate, water pricing structure, conservation practices, use restrictions, and soils and landscaping; or

(b) Design criteria or guidelines in the most recent edition of the department manual for design of Group A public water systems.

(4) The design for water systems based upon metered water use records shall have an MDD no lower than three hundred fifty gallons per day per equivalent residential unit (ERU), except for the design of any expansion to an existing water system that has a minimum of two years of meter records that clearly demonstrate that a lower design value for MDD may be used without significant risk of pressure loss. The meter records must correlate the demand data to the actual level of occupancy for the periods covered by the records.

(5) The minimum water demand and duration required for fire flow and/or fire suppression storage shall be determined by the local fire control authority, or chapter 246-293 WAC for systems within the boundaries of a designated critical water supply service area (CWSSA). Public water systems that are not required to comply with minimum fire flow standards shall coordinate with the local fire control authorities to ensure that any hydrants on the system, if they can possibly be used in the course of fire suppression activities, do not create adverse pressure problems within the water system as a result of fire control actions.

[Statutory Authority: RCW 43.02.050. 99-07-021, § 246-290-221, filed 3/9/99, effective 4/9/99.]

WAC 246-290-222 Water system physical capacity. (1) The water system physical capacity shall be established by evaluating the capacity of each system component such as source, treatment, storage, transmission, or distribution, individually and in combination with each other. The evaluation shall identify any limitations on the ability of the system to provide service to all consumers.

(2) The water system physical capacity shall be:

(a) Reported in terms of total equivalent residential units (ERUs) and the number of residential and nonresidential connections with the number of ERUs they represent; and

(b) Compared to the existing number of residential and nonresidential connections currently served and the ERUs they represent.

(3) Total source capacity calculations shall not include emergency sources as defined in WAC 246-290-010.

(4) Total daily source capacity, in conjunction with any storage that is designed to accommodate peak use periods on a daily or longer basis, shall be sufficient to provide a reliable supply of water equal to or exceeding the MDD.

(5) Treatment capacity, in conjunction with any storage designed to accommodate peak demand periods on a daily or longer basis, shall be sufficient to provide a reliable supply of treated water equal to or exceeding the MDD while meeting the water quality parameters set forth in Part 4 and Part 6 as applicable, of this chapter.

(6) Water storage shall be sufficient to meet expected system service demands by providing sufficient operational, equalizing, standby, and where applicable, fire suppression storage volumes in accordance with WAC 246-290-235.

(7) Distribution system capacity shall provide for PHD, or MDD plus required fire flow, as required in each pressure zone while maintaining minimum design pressures established under this chapter.

[Statutory Authority: RCW 43.02.050. 99-07-021, § 246-290-222, filed 3/9/99, effective 4/9/99.]

WAC 246-290-230 Distribution systems. (1) The purveyor shall size and evaluate new, or expansions to existing, distribution systems using a hydraulic analysis acceptable to the department.

(2) The minimum diameter of all distribution mains shall be six inches (150 mm) unless smaller mains can be justified by hydraulic analysis.

(3) Systems designed to provide fire flows shall have a minimum distribution main size of six inches (150 mm).

(4) Installation of new standard fire hydrants shall not be allowed on mains less than six inches (150 mm) in diameter. Existing fire hydrants on currently active mains less than six inches (150 mm) in diameter shall be allowed to remain provided:

(a) The existing distribution system consists of mains at least four inches (101.6 mm) in diameter, and the fire flow available from existing four-inch (101.6 mm) mains within the proximity of the fire hydrant exceeds the minimum fire flow standard adopted by the local fire protection authority; and

(b) The location and installation of the fire hydrants on the four-inch (101.6 mm) main have received approval by the local fire protection authority.

(5) New public water systems or additions to existing systems shall be designed with the capacity to deliver the design PHD quantity of water at 30 psi (210 kPa) under PHD flow conditions measured at all existing and proposed service water meters or along property lines adjacent to mains if no meter exists, and under the condition where all equalizing storage has been depleted.

(6) If fire flow is to be provided, the distribution system shall also provide maximum day demand (MDD) plus the required fire flow at a pressure of at least 20 psi (140 kPa) at all points throughout the distribution system, and under the condition where the designed volume of fire suppression and equalizing storage has been depleted.

(7) Booster pumps shall be designed in accordance with good engineering criteria and practices as listed in WAC 246-290-200.

(8) On existing systems, or for additions to existing systems, that are unable to meet the pressure requirements of this section, booster pumps for individual services may be used in the interim until system improvements are made to resolve pressure deficiencies. In this situation, the individual booster pumps shall be under the management and control of the purveyor.

(9) Transmission lines as defined in WAC 246-290-010 shall be designed to maintain greater than or equal to five psi (35 kPa) during normal operations, except when directly adjacent to storage tanks, and shall be sized according to a hydraulic analysis. Transmission mains designed to operate at velocities greater than ten feet per second shall include a hydraulic transient (water hammer) analysis in conjunction with the hydraulic analysis.

[Statutory Authority: RCW 43.02.050. 99-07-021, § 246-290-230, filed 3/9/99, effective 4/9/99. Statutory Authority: RCW 43.20.050. 94-14-001, § 246-290-230, filed 6/22/94, effective 7/23/94; 93-08-011 (Order 352B), § 246-290-230, filed 3/25/93, effective 4/25/93; 91-02-051 (Order 124B), recodified as § 246-290-230, filed 12/27/90, effective 1/31/91. Statutory Authority: RCW 34.04.045. 88-05-057 (Order 307), § 248-54-135, filed 2/17/88. Statutory Authority: RCW 43.20.050. 83-19-002 (Order 266), § 248-54-135, filed 9/8/83.]

WAC 246-290-235 Distribution reservoirs. (1) Distribution reservoirs shall be designed to:

(a) Prevent entry by birds, animals, insects, excessive dust, and other potential sources of external contamination. The design shall include provisions for a lockable weathertight roof, a screened roof vent, an overflow pipe with atmospheric discharge or other suitable means to prevent a cross-connection, sample collection capability, a drain to daylight (or an approved alternative that is adequate to protect against cross-connection), a provision for tank isolation in order to perform maintenance procedures, and other appurtenances appropriate to the protection of stored water from contamination;

(b) Maintain water circulation, prevent water stagnation, and provide adequate disinfection contact time; and

(c) Be accessible for routine maintenance and water quality monitoring.

(2) Equalizing storage, as defined in WAC 246-290-010, shall be provided to meet peak periods of demand, either daily or longer, when determined to be necessary based on available, or designed, source pumping capacity.

(3) Operational, standby, and fire suppression storage volumes as defined in WAC 246-290-010 shall be provided, as applicable, for all pressure zones to meet both normal as well as abnormal demands of the system.

(4) Standby and fire suppression storage volumes may be nested with the larger of the two volumes being the minimum available, provided the local fire protection authority does not require them to be additive.

[Statutory Authority: RCW 43.02.050. 99-07-021, § 246-290-235, filed 3/9/99, effective 4/9/99.]

WAC 246-290-250 Treatment design. (1) Treatment systems or devices shall be piloted and designed to ensure finished water quality conforms to water quality standards established in WAC 246-290-310.

(2) Treatment systems or devices for surface water or GWI sources shall be designed in accordance with the provisions of Part 6 of this chapter and the applicable provisions herein.

(3) Predesign studies, including pilot studies as appropriate, shall be required for proposed surface water and GWI sources and those ground water sources requiring treatment. The goal of the predesign study shall be to establish the most effective method, considering economics, to produce satisfactory finished water quality meeting the requirements of this chapter and complying with the treatment technique requirements in Part 6 of chapter 246-290 WAC. The predesign study shall be included as part of the project report under WAC 246-290-110. Refer to WAC 246-290-676 for requirements relating specifically to the filtration facility pilot study. The purveyor shall not establish nor maintain a bypass to divert water around any feature of a treatment process, except by written permission of the department.

(4) All well and spring sources not determined to be GWI's shall have continuous disinfection that meets the operational requirements of WAC 246-290-451 (3) and (4). The department may modify the requirement for disinfection for public water systems that demonstrate the well or spring sources (not confirmed as GWI's) have satisfactory bacteriological histories at the source and have SCAs in accordance with WAC 246-290-135.

(5) Purveyors shall use appropriate treatment technologies, such as those outlined in department guidance on water treatment, and shall address water treatment facilities in their water system plans pursuant to WAC 246-290-100.

(6) Project reports for the design of treatment facilities shall meet the requirements of WAC 246-290-110.

(7) Construction specifications for treatment facilities shall meet the requirements of WAC 246-290-120.

[Statutory Authority: RCW 43.02.050. 99-07-021, § 246-290-250, filed 3/9/99, effective 4/9/99.]

Statutory Authority: RCW 43.20.050. 93-08-011 (Order 352B), § 246-290-250, filed 3/25/93, effective 4/25/93; 91-02-051 (Order 124B), recodified as § 246-290-250, filed 12/27/90, effective 1/31/91. Statutory Authority: RCW 34.04.045. 88-05-057 (Order 307), § 248-54-155, filed 2/17/88. Statutory Authority: RCW 43.20.050. 83-19-002 (Order 266), § 248-54-155, filed 9/8/83.]